

Space-based telemedicine device goes commercial

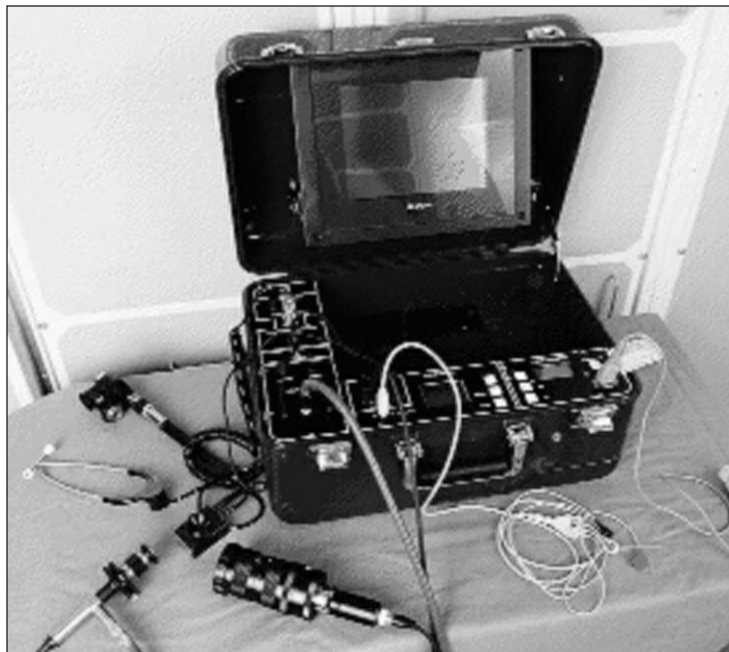
One of the many NASA-developed technologies on display during Inspection99 was a unique device that may revolutionize the way medical exams are performed in the future.

The Telemedicine Instrumentation Pack (TIP) resembles a small metal suitcase and weighs about 40 pounds. This portable system was designed to meet the constraints of space flight. During a mission, the TIP allows the crew medical officer, who may not necessarily be a physician, to monitor a fellow crewmember's heart, lung, and bowel sounds; ear, nose, throat, and skin conditions; and electrocardiogram, oxygen saturation, and blood pressure. The crew can then transmit the medical data to the Mission Control Center flight surgeon or other medical specialist to get a diagnosis and suggested treatment.

The TIP could be used on Earth in any setting where access to health care or medical specialists is not readily available. This enormous commercial potential excited Stephen Wyle, president of CyberMDx, who is currently developing a business model to expand the use of what he calls the

"doctor's electronic medical black bag."

"TIP is a prime example of NASA-developed technology that has applications on Earth," said Wyle.



The Telemedicine Instrumentation Pack

Diagnostic data collected using TIP's sensors, fiber optics and computer chips is presented in an electronic chart, which can be e-mailed to physicians and specialists who can then review it and make

recommendations, with doctors and examiners at separate locations engaging in a kind of medical teleconferencing.

According to Wyle, physicians can't visualize how TIP can be used in their practice, but he believes that use of the device will increase. Rather than having employees travel to clinics for exams and diagnoses, businesses can set up a TIP clinic on site with a nurse. The patient can visit the nurse, who can collect all necessary data and e-mail it to a distant doctor. The doctor can then review the data and make recommendations. Or the record can be e-mailed to a specialist. The company would save money on the costs associated with running a fully staffed clinic, and the process would allow health maintenance organizations to be more responsive to patients, while reducing costs.

TIP can be used for diagnosing ambulatory problems or for more chronic or severe issues like fluid in the lungs. Wyle hopes to expand the capabilities of TIP to cover blood analysis and ultrasound.

CyberMDx hopes to win approval from the U.S. Food and Drug Administration soon, allowing it to begin marketing the

device. Wyle envisions the devices in offices, nursing homes, remote work areas, offshore oil platforms, and cruise ships. Since it is portable, it could be used in ambulances.

The problem now is to develop a business model for use of the device that will fit into the existing regulatory environment. Medicare will not pay for medical examinations using the technology that do not have doctors at each site. And issues could arise over medical licensing if doctors are licensed to practice in one state but clients are in another.

Wyle learned about TIP last year when Wyle Laboratories, a company founded by his father, acquired Krug Life Sciences. The acquisition included the rights to TIP. Since neither company was structured to develop the device commercially, Wyle left Wyle Laboratories and started CyberMDx, which is developing the project with assistance from the Houston Technology Center, a business accelerator that helps companies commercialize new technologies.

CyberMDx is based in Los Angeles but its technical staff is located in Houston.

Wyle has high hopes for spreading the commercial use of NASA-developed technologies. "We want to become a poster child for NASA to see technologies it develops become commercialized," said Wyle. ■

Navigational tool helps the visually impaired surf Web

A Web search tool that is helping visually impaired people retrieve text-based data quickly off the Internet was one of many NASA-developed technologies on display during Inspection99.

An acronym for Internet Library Information Access Device, ILIAD was originally developed in 1995 at JSC by a NASA/contractor team as a classroom aid for teachers, who are among NASA's biggest consumers of information about the space program. Because many teachers have limited computer access, they needed a simple, timesaving way to search the Web.

The idea behind developing ILIAD was to enable teachers to send electronic mail on a very simple computer. The mail would come to computers in Bldg. 12 at JSC, where it would be automatically processed and an electronic search would be conducted over the Internet using key words listed in the message. An e-mail message would be sent back to the user.

The original, e-mail-based version of ILIAD has been operational since July 28, 1995. A Web-based version was developed in 1997.

It happens that ILIAD's text-based e-mail interface is ideally suited for Internet users who are either blind or visually impaired. That's because visually impaired Web surfers much prefer using text-based e-mail search tools to graphical Web browsers such as Microsoft Internet Explorer or Netscape Navigator.

Early on, all software primarily ran in text-mode under MS-DOS. Blind users could access information using DOS-based screen readers and e-mail programs. But as computers and software technology expanded to reading graphical material, text-based software became almost obsolete.

It's not just that blind people can't see the graphs and charts. Information in charts and graphs can't be read as text by most browsers.

That's where the ILIAD system comes in. Not only does it search out text-based information on the Web but it can also strip the coding from some graphical material and present the information in a text-based format. Then visually impaired Web surfers can use computer-voice programs to have the data read to them by their computers, or

magnify the text to read via enlargement programs. They can also print out the information in Braille.

Dr. Robert Shelton, a blind NASA/JSC computer scientist, was one of the members of the team that developed ILIAD.

"When I took over the project, I was new to the Internet," said Shelton. "ILIAD has opened up the Internet as a resource for me." He uses ILIAD, as do other members of his Learning Technologies Project team, when he needs to do Web searches.

ILIAD was designed to be quick and extremely easy to use. Visually impaired users send an e-mail message to the ILIAD home address and type in the search request using keywords.

ILIAD allows users to send keyword queries to multiple search engines on the Web. The program screens out highly graphical and duplicate documents, performs searches off-line, and has search results e-mailed as full-text documents, all in a

quick turnaround time—usually 15 to 30 minutes. Specialized options include sending keywords to a single Web search engine, receiving search results with embedded hyperlinks or as an HTML document, and retrieving documents from a specific Web address.

The receiver must then have the means either to magnify the text, have it printed in Braille, or have it read. Most computers today come equipped with zoom-text features. And text-to-speech software can be purchased for

only a few hundred dollars.

Most ILIAD users receive the results of their searches as individual text documents in their e-mail.

"ILIAD is a gateway for blind people," said Shelton. "It gives them an incentive to use other advanced tools as appropriate or, in some

cases, they are content to continue using ILIAD."

Since becoming operational, the ILIAD site has had more than 10,000 visits, with

the NASA site averaging approximately 1,000 search requests each month.

The ILIAD Web site is located at JSC and on the campus of the University of Texas. The American Foundation for the Blind in New York is exploring the possibility of hosting ILIAD on its server as a permanent home.

There's no charge

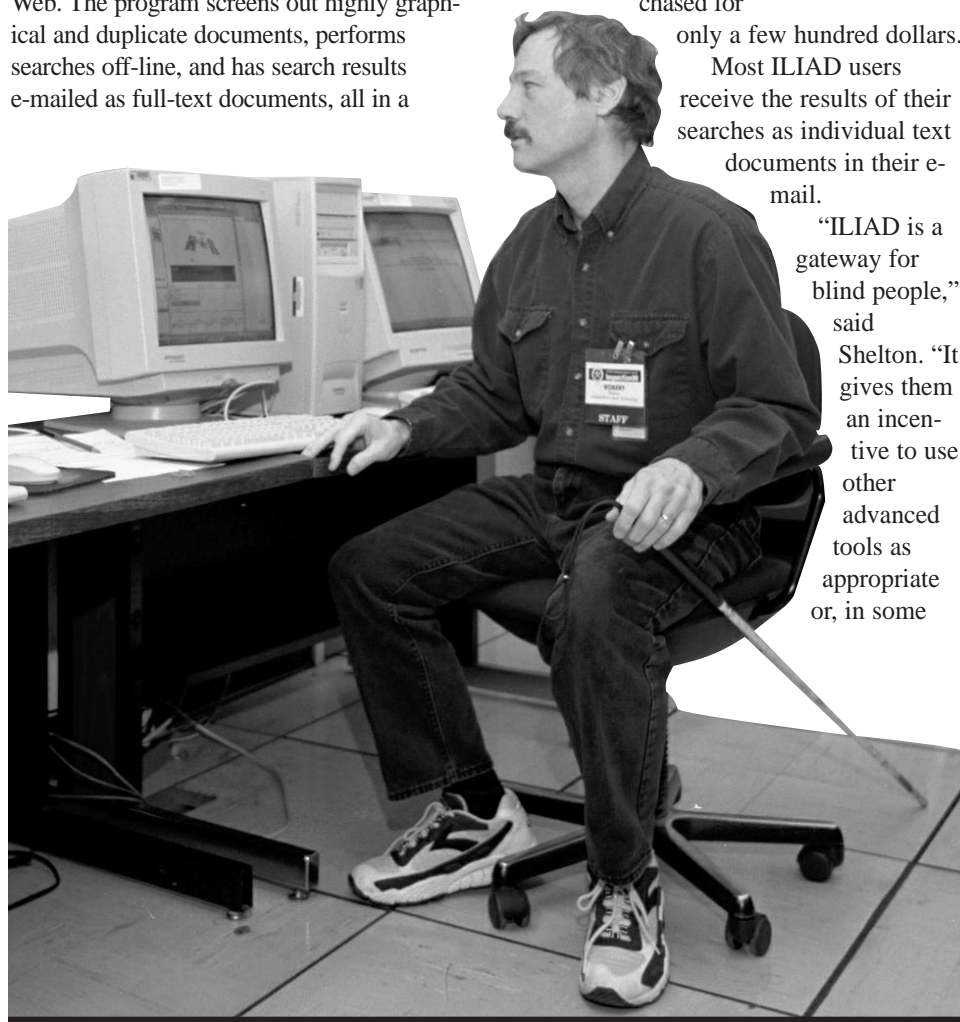
and few hardware requirements to use ILIAD. All that is needed is a computer, a modem of any speed, and an Internet service provider to access the site.

For information on using ILIAD, send an e-mail message to iliad@prime.jsc.nasa.gov or iliad@rosy.tenet.edu. The subject line should be "start iliad" (with no quotes), and the body of the message should be empty. A return e-mail will walk users through their first session.

The goal of NASA's Learning Technologies Project is to promote the growth of a national information infrastructure using the vast amount of information NASA has acquired since its creation. In addition to Shelton, other members of the LTP team at JSC are Stephanie Smith, Dat Truong and Terry Hodgson.

Some of LTP's other unique projects include NASA Qwhiz!, an Internet game created for K-12 students and teachers that allows children in schools throughout the nation to compete in live, head-to-head NASA Qwhiz! tournaments in which they are tested on their knowledge of NASA missions, and SIMON, a smart search tool and Web lesson builder for teachers.

A new Web-based software tool called ROVER Ranch that uses 3-D VRML modeling techniques to teach K-12 students fundamental concepts about science and robotics will be available next fiscal year. ■



Dr. Robert Shelton, JSC computer scientist, discusses the use of the Internet Library Information Access Device during Inspection99.

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